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The American University in Cairo
School of Global Affairs and Public Policy

Military spending and Natural resources:

Evidence from global data

A Thesis Submitted to

Department of Public Policy and Administration

**In partial fulfillment of the requirements for
The degree of Master of Public Policy and Administration**

Submitted By

Noha Ahmed Hassan

Under the Supervision of

Hamid Ali, PhD

Professor of Public Policy and Administration

The American University in Cairo

School of Global Affairs and Public Policy

MILITARY SPENDING AND NATURAL RESOURCES: EVIDENCE FROM GLOBAL DATA

A Thesis Submitted by

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To the Department of Public Policy and Administration

May 2014

In partial fulfillment of the requirements for the

Degree of Master of Public Administration and Public Policy

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The American University in Cairo
School of Global Affairs and Public Policy
Department of Public Policy and Administration

Military spending and Natural resources:

Evidence from global data

Noha Ahmed Hassan Mohamed

Supervised by Professor Hamid Ali

ABSTRACT

Most of the studies show a clear relation between the increase of Oil revenues and the rapid increases in the military expenditure and arms imports (Perlo-Freeman, et al, 2011, Ali 2013). According to the Stockholm International Peace Research Institute (SIPRI, 2010), rising prices and new Oil and Gas exploitation have given governments windfall revenues, some of which have found their way into military spending. Using global data from 1988 to 2013 for 119 countries, this research aim to study: To what extent does the rent from natural resources affect the military spending? Is the countries level of development vis-à-vis military spending? This study will add to the literature available on the consequences of Natural resources on military spending and support the resources curse hypotheses that building up the military-industrial complex intertwined with the natural resources revenues windfall. In addition, it has been shown that natural resources have got negative impact on defense spending such as Oil and natural gas. Moreover, a variable such as Openness has got a crucial significant impact on military spending, while the rent from minerals and coal are ambiguous and has no certain impact on military spending.

Keywords: Military Spending; Natural Resources; Openness; Global Data

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Chapter One Introduction

1.1 Introduction:

After the global financial and economic crisis in several nations the military spending has risen over the decade of the 2000s, reaching USD 1,631 billion in 2010, an increase of 53 percent compared to base year 2000 (Perlo-Freeman, et al, 2011). In addition, the Global Military Expenditure stands at over 1.7 trillion in annual expenditure at current prices for 2012. Then it fell by half a percent compared to 2011 (SIPRI Military Expenditure, 2013).

The increase in the global military expenditure was led by the US and other countries in region such as Saudi Arabia, Qatar, and Kuwait are following similar trends. Their region currently spends 7.4% of their gross domestic product (GDP) on military, although the global military spending average is 3.1%.

A combination of factors that showed the increase in military spending in the recent years is attributed to these factors: the foreign policy objectives and the availability of natural resources. Most of nations follow the policy of developing their military power and influence. However, they could follow the trend of using their natural resources revenues in order to provide income to increase military expenditure.

The Middle East region has the highest average ratio of military spending to gross domestic product. This is obviously because of the high level of regional tension. In addition, it is due to the global agreements between countries in order to sheer size of the oil and gas revenues in order to permit armed contracts such as the Al-Yamamah between Kingdom of Saudi Arabia and The United Kingdom (Leigh and Evans, 2007).

Furthermore, many Western Europe countries and USA during the financial crisis the government cut backs military spending is spared. According to the Stockholm International Peace Research Institute (SIPRI, 2010):

*Some nations like China and India have enjoyed economic growth but not experienced a downturn.

* Most developed (and some larger developing) countries have boosted public spending to tackle the recession using large economic stimulus packages. Military spending, though not a large part of it, has been part of that general public expenditure attention and some also call this “Military Keynesianism” (SIPRI, 2010).

*Geopolitics and strategic interests are still factors to project or maintain power: *“rising military spending for the USA, as the only superpower, and for other major or intermediate powers, such as Brazil, China, Russia and India, appears to represent a strategic choice in their long-term quest for global and regional influence; one that they may be loath to go without, even in hard economic times”*, (SIPRI, 2010).

In contrast, “when it comes to smaller countries — with no such power ambitions and, more importantly, lacking the resources and credit-worthiness to sustain such large budget deficits — many have cut back their military spending in 2009, especially in Central and Eastern Europe” (Perlo-Freeman, Ismail and Solmirano, 2010).

For example, “China and India, the world’s two emerging economic powers, are demonstrating a sustained increase in their military expenditure and contribute to the growth in world military spending. In absolute terms their current spending is only a fraction of the USA’s. Their increases are largely commensurate with their economic growth” (Shah, 2013; Paul dunne, 2012).

Furthermore, natural resources play a crucial role in driving the military spending and arms imports in the developing nations because, the rise of the oil prices led to more arms importing. The “natural resource curse” has long been recognized as a phenomenon whereby nations, despite abundant rich resources, find themselves in conflict and tension due to the power struggles that those resources bring (Shah, 2013; Sachs and Warner, 1995, 1999, 2001; Leite and Weidmann, 1999; Collier and Gunning, 1999).

According to the Stockholm International Peace Research Institute (SIPRI, 2010), it's reported that, KSA, Algeria, Azerbaijan, and Russia have been capable of increasing spending because of the increased oil and gas revenues. In contrast, according to (Perlo-Freeman, et al, 2011, Ali 2013) most of the studies show a clear relation between the increase of Oil revenues and the rapid increases in the military expenditure and arms imports. On the other hand at the Latin of America specifically in Chile and Peru's the increases in resources driven because their law to profits from the exploitation of key natural resources linked by their military spending.

It was debated that the presence of new natural resources would be greatly increasing the risk of conflicts between nations, specifically if these resources include oil and gas (Bannon and Collier, 2003).

Most of the cases, there's a clear relation between the increase of oil revenues and the rapid increases in the Military Expenditure and arms imports. According to the Stockholm International Peace Research Institute (SIPRI, 2010), rising prices and new Oil and Gas exploitation have given governments windfall revenues, some of which have found their way into military spending.

1.2 Research Question

So far in we exclude (Freeman and Brauner, 2012; and Ali & Omnia, 2013) little empirical studies were established to relate between military spending and natural resources rent. Therefore, this study will follow the framework of Freeman and Ali to extent the data to all countries with available data and add new variables such as openness and utilize both of GMM model and panel dynamic model. The research question which's proposed in this study is: To what extent do the natural resources affect the military spending? Is the countries level of development represent by per capita income and level of growth vis-à-vis military spending? The implications of that would be used in order to develop new policies that can address increase in the military expenditure, resulted from windfall of natural resources.

Using global data from 1988 to 2012 for 119 countries, this thesis aims to examine whether there are relation between the natural resources and the increase of the military spending.

1.3 Significance of the Study

The purpose of this study is to add to the literature available on the consequences of Natural resources on military spending. This study tackles many reasons to believe that high levels of natural resources dependency could lead to high levels of military spending and arms imports. Furthermore, building up the military-industrial complex to protect the national security in order to provide basis or justifications to inefficient allocation of resources. (Ali, 2012). Although, the available limited research using empirical studies provide mix results on the relation between natural resources rent and military spending except oil. Thus, this study will help policy makers and other stakeholders to pay attention to the increasing rates of military spending at the expense of other needed sectors of the economy.

1.4 Objectives of the Study

The objectives of this study aim to investigate the effect of natural resources on military spending by using panel from the period 1988 to 2012 for 119 countries. It is important to define what is meant by conflict and identify some of the underlying reasons why there's relation between the increasing percent of military spending and natural resources rent. Thus, the study first looks at identifying these reasons. The study then examines the consequences of conflict on military spending.

1.5 outline of the Study

This thesis is made up of five chapters. Chapter one will approach an introduction about my topic. Chapter two will review the current literature reviews on the military spending and natural resources. Chapter three provides the data sources and methodology that used in the empirical analysis of this thesis. Chapter four offers the model results from the used data and empirical models in this study. Finally chapter five provides concluding remarks and the implication of the findings from the study and the recommendation.

Chapter Two: Literature Review

This chapter provides the previous studies and data that show the patterns between the natural resources and the military spending on the global scale and regions. Moreover, this section offers several cases from different countries on the negative consequences of rising military spending.

2.1 Military spending & Economic growth

Many countries have high rates of military expenditure in order to sustain a credible deterrence. However, the increase percent of military spending is an undesirable issue and it's categorized as a burden on an economy because the high spending on defense affects the diversity of resources allocation for development projects.

According to Stockholm International Peace Research Institute (SIPRI, 2013), world military spending have crossed the figure of \$1.63 trillion in 2010 that indicates a 1.3 percent increase in real terms from 2008 military expenditure and 50 percent increase since 2011. Consequently, military spending is the principal component of any government expenditure which is used as a fiscal policy issues to raises the economic growth and to pursue the stated security goals.

Generally, military spending is considered as public good expenditure of an economy but military economics analyzes the ingratiation of defense expenditure and growth of that economy through different routes (Ando, 2009). Many scholars as (Tahir and Sajid, 1999) have applied different causality tests on the real military spending and the gross domestic product (GDP) for LDCs. The results of these studies showed that there are one way causal relation from GDP to military spending for Guatemala and Venezuela. In addition, there's a one way causal relation from military spending to GDP in Turkey. On the other hand, there isn't a relation between military spending and GDP for Sri Lanka, Ecuador, and Philippines. Therefore, this field of study still has a bi-directional causal relation between military spending and GDP.

2.1.1. Military spending cause Economic growth

Several studies showed the causality between military spending and economic growth for several least developed countries (LDCs). Several authors have applied the causality test on various countries which decomposed series of the actual military spending and the real output. These findings carried between casual relation and bi-directional causality between military spending and economic growth.

According to Joerding, 1986 stated that military can affect economic growth through different routes such as "aggregate demand effect". This effect represents the relationship between the quantity of outputs that a country is willing to provide and the actual price levels and that generate a negative relation between price levels and aggregate demand is known as total spending. In addition, Joerding thought that if an economy enjoys high growth rates, it can increase military spending in order to protect any country from foreign aggression and to ensure the international stability (Joerding, 1986).

Kentor& Kick (2008) made several examinations about the major capital of military organizations in the most world's countries whether developed or less developed countries. Both of them used several panels and analysis such as "cross sectional panel regression and causal analysis" of developed and less developed countries from period 1990 to 2003. Their findings and results showed that the actual military spending per soldier prohibit the growth of per capita gross domestic product (GDP). Moreover, their findings showed that the policies of arms imports have a positive impact on economic growth and that found only in the less developed countries.

Hou (2009) took about 36 developing countries in study and he focused specifically on India in order to examine to what extent the military expenditure affect on the economic growth of a country. He used several panel data and cross sectional techniques in order to find the impact of military spending on economic growth. His conclusions showed a negative impact of military spending on the economic growth. In contrast, (Ali, 2012; Dunne, P., Nikolaidoua, E. and Vougas, D., 2001; Smith, R. and Dunne, Paul.J, 2002) their studies assumed that there's a negative impact of military spending on the economic growth.

In addition, Lai et al (2002) examined the relation that lies between military spending and economic growth by using "*Endogenous Growth Model*" that shows the demand side factors. Their results and findings showed that if any economy spends more on its defense, it will enjoy high growth rates and that will lead to a high economic growth. Yildirim&Sezgin (2005) examined the linkages between military spending and government expenditure. They used panel data techniques for 92 countries from period 1987 to 1997 in order to estimate the impact of government expenditure on military spending. Their results showed a positive impact of government expenditure on military spending.

Ando (2009) examined the relation that lies between military expenditure and economic growth in the context of *Military Economics*. He used Feder Model that discusses that an economy consists of two principal sectors "Private and public" in order to estimate the economic growth *109 countries* with 30 Organization for Economic Co-operation and Development (OECD), by using panel data during the period of 1995 to 2003. His results showed as military spending increases, economy will grow and there's no negative impact from the military spending on economy.

2.1.2. Economic growth cause military spending

Looney (1989) assumed that the national income level of an economy could be showed as the most crucial indicator to illustrate the level of military spending for that economy. Hewitt (1996) in his studies about shifting from economic growth to defense spending he examined the gross national product rate (GNP) and to what extent its impact on military spending. His results showed that *“The relationship might appear convex as estimated coefficient on log of gross domestic product appears negative and they appear positive when he use log of gross domestic product square”* (Hewitt, 1996).

Batchelor (2002) examined the military spending in *South Africa countries* from period 1963 to 1997. The results showed that the level of military expenditure is being estimated by national income. Tamubudzi (2007) focused on 12 *Southern African countries* during the period 1997 to 2004 in order to examine their military spending by using cross sectional and panel data techniques. His results assured the importance of GDP per capita in estimating the level of military *"burden"* that an economy could afford. In contrast, Sun and Yu (1999) found that the military spending of china is positively affected to its gross national product (GNP).

Moreover, Al-Yousif (2002) examined the relationship between military spending and economic growth by using six Gulf countries from period 1975 to 1997. *According Al-Yousif, “A multi-variant error correction model has been used with granger causality test by author to get results”*. The results showed that the relationship between military spending and economic growth cannot be simplified and should be seen in the context of socio-economic conditions of a country economy (Al-Yousif, 2002).

2.2 The impact of natural resources on economic growth

In this study, we use two variables in order to indicate the level of development are GDP growth and GDP per capita income in the model estimation. This debatable issue is to what extent there is a relationship between natural resources and economic growth of a country. However, most of studies assured that natural resources are a crucial developed factor for many countries, since 1990s some studies found that “resource rich countries growth has been lower in comparison to resource poor ones” (Sachs and Warner, 1995, 1999, 2000). These findings are known as "Cursed of natural resources" that have been discussed in various literatures (Leite&Weidmann, 1999; Gylfason, 2001).

In the 1990s, this era was witnessing strong and negative linkages between natural resources exports and growth rates (Sachs, Warner, 1995, 1999). Sachs's & Warner's studies used a large scale data which consists of 95 *countries*. In addition, (Sachs, Warner, 1995, 1999) indicated that “*after controlling for a number of factors, natural resources — measured by primary-product exports as a percentage of GDP — have a negative impact on economic growth.*” In addition, several evidences showed the close relationship between natural resources abundance and armed conflict that has a negative impact on the quality of *institutional system*; therefore natural resources *hamper* the economic growth.

In contrast, R.Auty, “*In recent decades the resource-abundant developing countries have underperformed when compared with the resource-deficient developing countries. Between 1960 and 1990 the per capita incomes of the resource-poor countries grew at rates two to three times faster than those of the resource-abundant countries and the gap in the growth rates has widened significantly since the 1970s*”(Auty, 2001).

Moreover, these findings had been examined by other researchers using various variables and *econometric specifications* and it has been become one of the most common and well known results in “the development literature” (Auty, 2001; Gylfason et al., 1999; Gylfason, 2001; Sala-i-Martin and Subramanian, 2003).

The debate of 'Resource Curse' not only raised the point of the negative impact of natural resources on slowing economic growth but it showed other points or consequences that are extremely crucial and affect the economic growth negatively.

These consequences are:

A. High Poverty Rates

B. High Corruption

C. The Authoritarian of a government

2.2.1. High Poverty Rates

According to the United Nations conference on trade and development, 2002, it examined the poverty rates and the fluctuations in poverty rates for the least 49 developed countries. It categorized these states according to their export structure, and identified them into two groups which are seven countries as 'nonfuel mineral exports' and three countries as 'oil exports' (Ross, 2003).

The results of this conference showed that, "the average poverty rate for the nonfuel mineral exporters was highest of all the categories of states in the most recent period (1997-99). The nonfuel mineral exporters also showed the greatest increase in poverty since the initial period 1981-83" (Ross, 2003). The question remains where the resources were spent. We strongly believe that military institutions are one of the beneficial for exporting the natural resources rent.

Ross (2003) examined the poverty rates by using cross national measures of poverty. He used various measures such as direct measure which is poverty, "is the percentage of the population living below the national poverty line." His results showed that the natural log of per capita GDP has a strong impact on poverty outcomes.

It's important firstly to know if most of types of 'primary commodities' are linked with poverty. According to Ross, 2003, "*The primary commodity dependence variable, however, does not tell us if all types of primary commodities are equally culpable. To determine what kinds of commodities are causing these effects, I divide primary commodity dependence into four categories – oil dependence, metals dependence, food dependence, and non-food agriculture dependence – and repeat the same tests*"(Ross, 2003). The results showed a positive relation between the primary commodities and the poverty rates. It assured that the dependency on oil and nonfuel minerals exports in the late 1990s is strongly linked with poverty rates and slowing down the growth of many nations.

Moreover, there's a clear cut that shows the primary commodities that are linked or generated poverty are caused by minerals, not agriculture. "In 1980, metals dependence was strongly linked to poverty and marginally linked to infant mortality ($p=.072$), while oil dependence was strongly tied to low life expectancy and high rates of infant mortality and child malnutrition" (Ross, 2003).

"In 1995, metals dependence was significantly associated with low life expectancy, high infant mortality and poverty, while oil dependence was strongly linked with high infant mortality and child malnutrition, and marginally linked with poverty ($p=.081$)" (Ross, 2003).

Therefore, from the above evidence it showed a strong linkage between minerals and poverty causes. These consequences affect the growth of a country negatively and we could see the poverty extent to include health issues and social deprivation, and exclusion issues.

2.2.2. High Corruption

Several scholars discussed how the effect of natural resources could be 'Heterogeneous' and related to national institutional context (Papyrakis and Gerlagh 2004; Costantini and Monni 2008).

"In countries with diffuse corruption, weak rule of law or 'grabbing institutions', a natural resource boom tends to depress growth, while in the opposite situation it produces positive effects" (Mehlum et al. 2006; Stijns 2005).

In addition, several scholars linked the natural resources rents and high corruption rates with the quality of governance. And they assured that military spending could be an indicator of the quality of governance. (Steve Knack and Nick Manning, 2000). They assured that good governance implies accountability and transparency and the excessive military expenditure has a great impact for having non-accountable governments. They concluded that the large hidden fractions of military spending have a great impact on less accountable governments.

2.2.3. The Authoritarian of a government

It has been discussed the matter of natural resources conflicts which are based on "grievance", which means the deprivation of a population that doesn't earn any benefits from the "exploitation of natural resources" (Basedau, 2005). For example, Wantchekon (2002), examined a case for 141 countries during the period of 1950 to 1990, found that "an increase of one per cent in natural resource dependence (measured by the ratio of primary export on GDP) increases the probability of an authoritarian government by about 8 per cent" (Wantchekon, 2002).

According to Ross (2011) and Collier & Hoeffler (2009), there's an "inverse link" between oil and mineral exports and democracy because there's an effect of resource rents on the economic performances of democracy. Therefore, the reliance on petroleum natural gas and minerals will create authoritarian political regimes. These findings are consistent in the Middle East/North Africa, where the regimes create a patronage system and oppression tools to subdue the citizens.

2.3 Natural resources & armed conflict

This part discusses the debate on the linkages between natural resources and armed conflict, debating that this conflict could arise when natural resources have specific natural and geographical characteristics and when a country experiences specific political, social and economic situations.

Many scholars have reached to an agreed point to a certain extent there's a relation between natural resources and armed conflict after examining and investigating several cases. In addition, they assured that before investigating the "nexus" between natural resources and armed conflict, it's crucial to set the scene firstly by introducing the principal definitions for the concepts of armed conflicts and natural resources.

According to the Uppsala Conflict Data Program (UNDP), "an armed conflict is a contested incompatibility which concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths in one calendar year" (UNDP, 1996). Though there are different studies and data sets that define the conflicts irrespective of the definition, the link between natural resources and conflict is existing.

Therefore, the existence or the absence of natural resources in a country has a great impact on causing armed conflict. However, there are countries like Botswana and Norway that are peaceful countries with plenty of natural resources. In contrast, there are countries such as the Democratic Republic of Congo (DRC) and Sierra Leone with abundance of natural resources but they experienced armed conflicts (UN, 2001). The availability of natural resources is not necessary to have conflict in democratically stable countries, however in fragile states, it can trigger conflict.

Furthermore, Japan is known as a peaceful country and it relies totally on foreign natural resources, while Haiti is a country which is suffering from the lack of natural resources and in return it experienced several armed conflicts. Again deprivation could trigger grievance conflict; stability is achieved through development, as in case of Japan.

These examples show different insights about each country from its culture, geographical position, location, and political stability. Thus the point of linking natural resources with armed conflict tends to be vague. These countries show that there's no clear inter-relation between armed conflict and natural resources in the global scale.

Furthermore, various scholars failed to show in their studies that there is a relation whether the scarcity or deficiency of natural resources linked to armed conflicts. Galtung argued that 'wars are often over resources' (Galtung, 1982), in contrast Brock (1991) argued that "it's easy to exaggerate the importance of natural resources as an object of conflict." While (Ross, 1999; De Soysa, 2000; Le Billon, 2001) considered natural resources as a curse that affects the state that possesses it.

It has been argued that the relation between natural resources and armed conflict concerns the political low dominance of government over its natural resources can indeed create an armed conflict. In contrast, when a country government dominates its natural resources, their people will benefit from the revenues that come from these natural resources. Acquiring these revenues is important for several reasons: first, the 'non-state groups' will not dominate natural resources and receive rent instead of the current residences. The second, the government can sustain its programs from natural resources revenues in ensuring social security and political stability. In addition, it's crucial to sustain social security and political stability because the lack of one of these issues will indicate a high degree of armed conflicts.

Various researchers focused on the inter-relation between natural resources and armed conflict did not only focus on these reasons only, but it also underlined which types of armed conflicts are more vulnerable to be caused in the conflict.

Le Billon (2001) argued that armed conflicts differ according to the concentration and the geography location of the natural resources. *“In his framework, when natural resources are point and proximate, non-state groups that want to challenge the state power could get the control of them only through a coup d’état and a change of regime, since these kind of natural resources are by definition easier to control by a government.”* In contrast, “point natural resources distant from the centre of a country could be obtained through secession, as shown by the example of the struggle for phosphates in the region of Western Sahara in Morocco” (Le Billon, 2001). Finally, *“the existence of natural resources distant from the centre of the state and diffuse can reinforce warlordism, as the numerous warlords who control part of the opium in Afghanistan demonstrate”* (Le Billon, 2001).

Collier and Hoeffler (2002) showed that there is a strong relation between the presence of natural resources and civil wars, and they also noticed that *“the higher is per capita income on an internationally comparable measure, the lower is the risk of civil war”* (Collier and Hoeffler, 1998).

2.4 Different types of natural resources linked to the armed conflict

There has been a general agreement that oil, gas, and mining rich countries could have affective and sustainable policies in order to be developed and diversified by having a well recognition of their political and economic outcomes and reforms (Benn Eifert et al. 2002). On the other hand there has been a growing emphasize that *‘resources and ethnic fissure’*, especially for low income countries, are linked with a great armed conflict (Blattman and Miguel, 2008).

Several scholars tried to examine the interrelation between natural resources and armed conflict. There has been a strong emphasize about the cause of armed conflicts and other conflicts as civil wars are linked with the primary commodities specially oil and gas. In addition, in our study we use minerals in general to see how its rent is used for defense spending.

2.4.1. Oil & Gas:

According to Ross (2004) & McNeish (2010), there have been several quantitative studies that examined the role of natural resources, specifically oil and gas, on the armed conflict. The studies showed that the relationship between oil and armed conflict is "non-linear" (Collier & Hoeffler, 2004). They found that the relationship between armed conflict and the primary commodities exports, specifically oil and gas, is neither *strong nor robust* (Collier & Hoeffler, 2002).

Their findings showed that natural resources such as oil and gas could predict wars not only they are considered as primary commodities and the principal sources of finance but also high oil exports shows a growing indicator of dropping conflicts of a country by given the level of 'per capita income' which could increase by \$5000 (Collier & Hoeffler, 2002). Therefore, "infragile state the military and institutional structures are not capable of effectively repressing an outbreak of armed insurrection as has happened, for example, in various Sub-Saharan nations" (Collier & Hoeffler, 2002).

Di John (2007) analyzed the linkages between oil and armed conflicts. His analysis showed that there's a weak correlation between the presence of oil and gas and armed conflicts. He argued that in oil rich countries where we could find violent or armed conflicts occur, oil is not the principal cause or reason, but there are other factors such as the weakness of a government, poor economic policies or borders conflicts that plays an important role. However, Fjelde (2009) argued that political corruption is not the principal cause of higher armed conflicts with natural resources such as oil and gas, because it's associated with the stability of regime itself. Moreover, another conflict that could be associated with natural resources such as oil. There are three contrasting findings that showed how natural resources such as oil and gas are or

linked to civil wars and conflicts. There are ranges of possibilities: a) conflict could be increased by oil; b) oil has no effect; c) oil has negative relation on the conflict; d) oil could impact on conflict with other factors.”(DeSoysa, 2002; Fearon and Laitin, 2003).

For example, one of the findings showed that the risk of civil war could be increased twice in oil exporting countries compared to the other countries. Furthermore, one of the recent studies by de Soysa and Neumayer (2007) showed that oil is linked with violence, *“but only with conflicts that have 25 casualties or less per year that is conflicts that are below the threshold of deaths commonly associated with civil war.”* In contrast, other studies found that oil wealth not linked to conflicts and there's a great chance that reduces the likelihood of civil war (Smith, 2004; Humphreys, 2005; Di John, 2007).

“While partly due to differences in methods and data, these contrasting findings also derive from variations in other factors that shape how oil and conflict are linked. One factor is time, with oil and conflict being more intertwined today than earlier” (Ross, 2006; de Soysa&Neumayer, 2007). In addition, another factor which is the nature of the country; Humphreys (2005) found that most of the oil-producing states are less likely to be facing or suffering from civil war.

This finding linked with a research by Basedau and Lay (2009), *“who assured that oil exporters tend to be prone to violence as a group, but countries that are more oil-rich in per capita terms are spared from internal violence despite being highly dependent”*. In other words, the states that are depending strongly on exporting oil or gas, but don't have a lot of it is hence, more prone to conflict than a oil-dependent country with relatively greater oil wealth.

2.4.2Diamonds:

Several studies in the literature on how diamonds and conflict are linked are *‘as inconclusive as the one on oil and conflict’*. Several studies by (Humphreys, 2005; Lujala et al., 2005) found that countries are more likely to experience civil war that have diamonds than countries that don't have. In contrast, Regan and Norton (2005) found that diamonds are not the reasons of making armed conflicts or civil wars.

(Ross, 2006) in his statistical research found simply that diamonds and armed conflicts *onset are not correlated*.

In addition, other studies that showed that diamonds connect to conflict in several countries. One study found that there're conflicts between diamonds and armed in Congo/Zaire, Russia, and South Africa (Ross, 2006). Furthermore, other countries as Sierra Leone, Angola, and Namibia linked with this conflict (Le Billon, 2008). Therefore, "*the number of conflicts in diamond-producing countries is so small, moreover, that statistical research only can give tentative conclusions about a diamond-conflict link*" (Ross, 2006; Le Billon, 2008).

Time and the type of diamonds are linked to the diamond's impact on conflicts— '*the link being stronger in our era than earlier*' (Lujala et al., 2005; Ross, 2006). There are several types of diamonds such as '*Kimberlitic diamonds*' which are extracted from mines in capital-intensive processes, while '*alluvial diamonds*' are collected up from riverbeds in more labor-intensive processes.

"In line with a commonly held assumption, some research finds that alluvial diamonds are more closely tied to civil war than are kimberlitic diamonds" (Lujala et al., 2005). In contrast, other studies found that there are different conclusions "that alluvial diamonds are more associated with peace than with war" (Snyder & Bhavnani, 2005), and "that alluvial diamonds are less related to civil war outbreak than are kimberlitic diamonds" (Ross, 2006).

Chapter Three: Data and Methodology

3.1. The Data

This study tends to use panel data for 119 countries for the period 1988 to 2012. To answer the research question the study will tackle two types of data collection. For the first type in depth information will be conducted from global organizations such as World Bank, United Nations Development Program (UNDP), Stockholm international peace research institute (SIPRI), and the International Institute for Strategic Studies: Military Balance (2005) and the Global Security website.

This study uses descriptive data to detect the trends and levels of military spending and natural resources rents to support the answer of the research question. The data will use GDP, GDP growth, GDP per capita, natural gas rent, oil rent, coal rent, mineral rent, and forest rent, and most of the data are collected from the World Bank (2013). In addition, most of Military spending data are from SIPRI (2013), measured as a percentage of GDP.

Figure 1 shows the global military spending from the period of 1988 till 2012. It shows the global military spending has reached over \$ 1.7 trillion in its annual spending for 2012. However, "It fell by around half a percent compared to 2011- the first fall since 1998" (SIPRI, 2013). Summarizing some details the data show that after the increase in the global military expenditure this indicates about 0.4 percent decrease in the actual terms in 2011- the first fall since 1998. In addition, "This corresponds to 2.5 percent of world gross domestic product (GDP), or approximately \$ 249 for each person in the world (SIPRI, 2013).

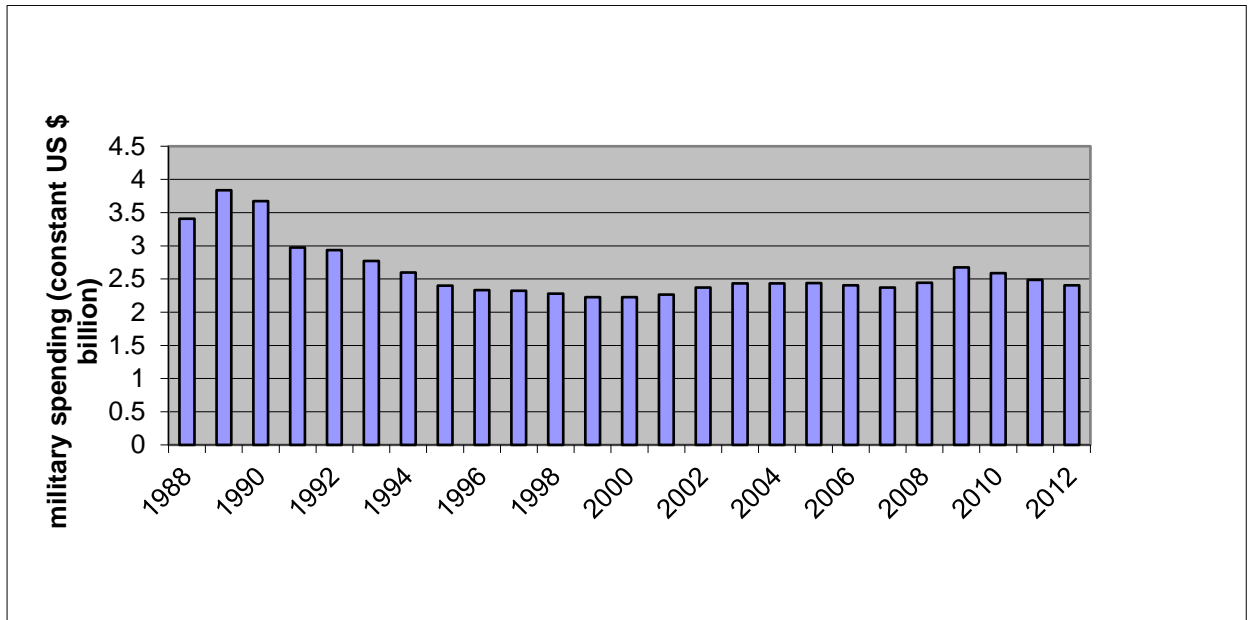
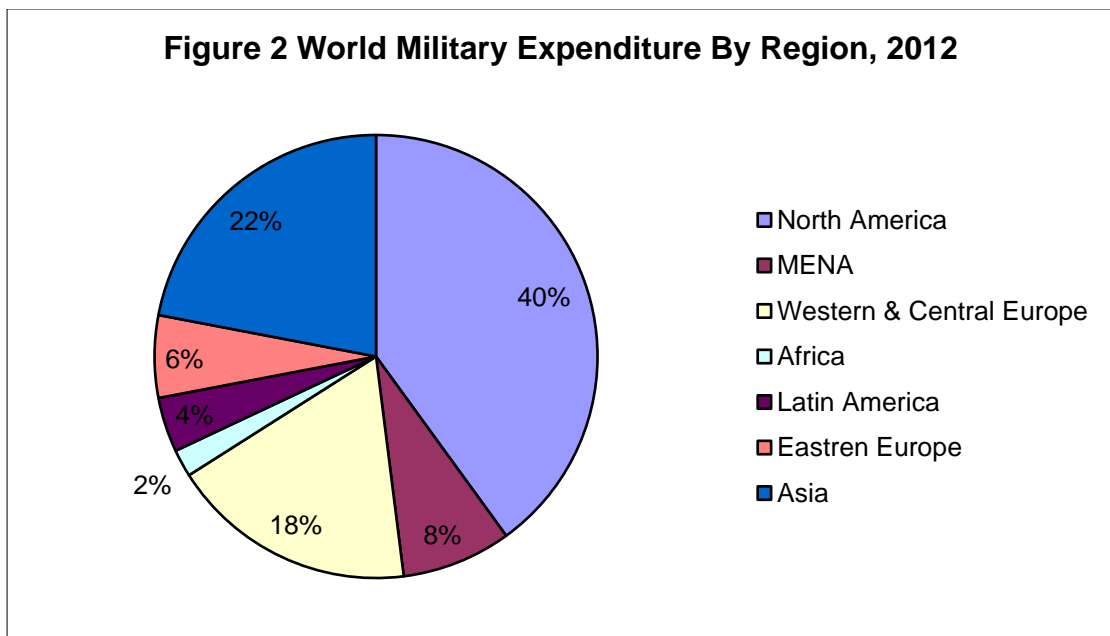


Figure 4 World Military Expenditure 1988-2012

Source: SIPRI Military Expenditure Database 2013, [http:// milexdata.sipri.org](http://milexdata.sipri.org)

Figure 2 shows the percentages of military expenditure according to each region. And as the data shows the highest spender is North America by 40%, followed by Asia 22%, Western & Central Europe 18%, and fourthly MENA 8%. These data shows that the military expenditure is increasingly rapidly in countries that lack natural resources but on the other hand they have got the highest GDP growth and per capita that ease this situation.



Source: SIPRI Military Expenditure Database 2013, [http:// milexdata.sipri.org](http://milexdata.sipri.org)

Figure 3 illustrates the global distribution of military expenditure in 2012. It shows the highest military spending specifically for 15 countries account over 81% of the total. As the figure shows the United States represents the highest percent of the world total military spending by 39.0% then followed by China which has 9.5% of world share, Russia with 5.2% of world share, then moving to United Kingdom 3.5%, and finally Japan by 3.4%.

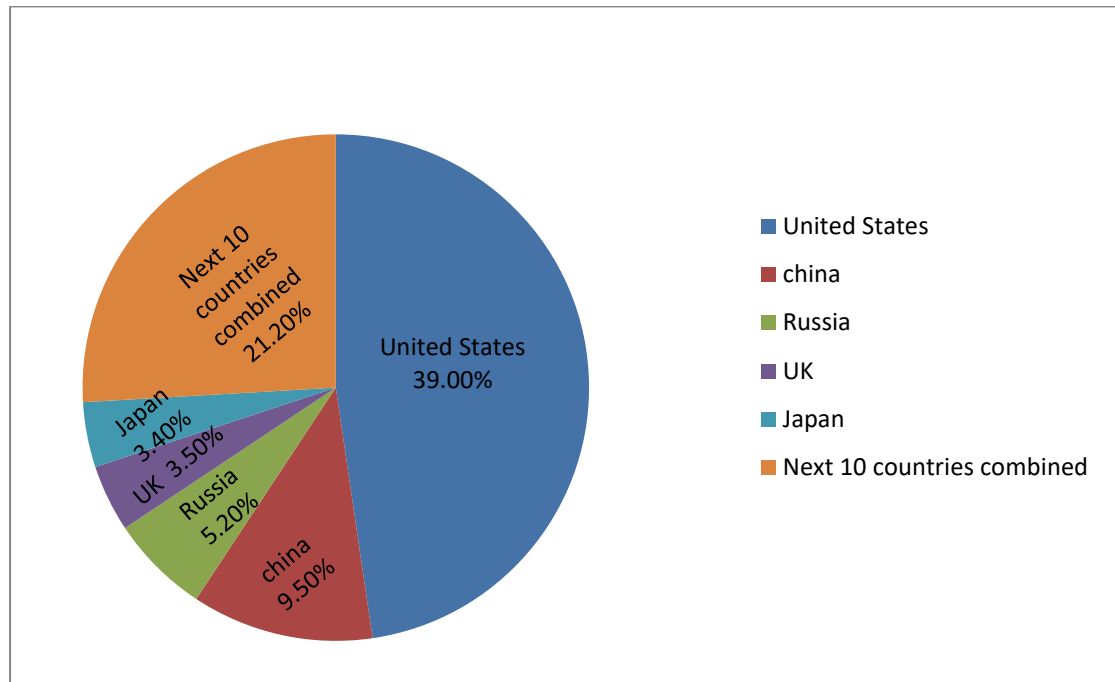


Figure 5 Global Distribution of military Expenditure in 2012

Source: SIPRI Military Expenditure Database 2013, [http:// milexdata.sipri.org](http://milexdata.sipri.org)

In figure 4, it is a continued pie chart to figure 3. It shows the other 10 countries ranging from 3.4% to 1.0%. starting from France its military spending is about 3.4% , KSA 3.2%, India's and Germany's share is 2.6%, Italy is 1.9, South Korea 1.8%, Australia 1.5%, Canada 1.3%, and the lowest one is Turkey 1.0%, and the rest of the world is 18%.

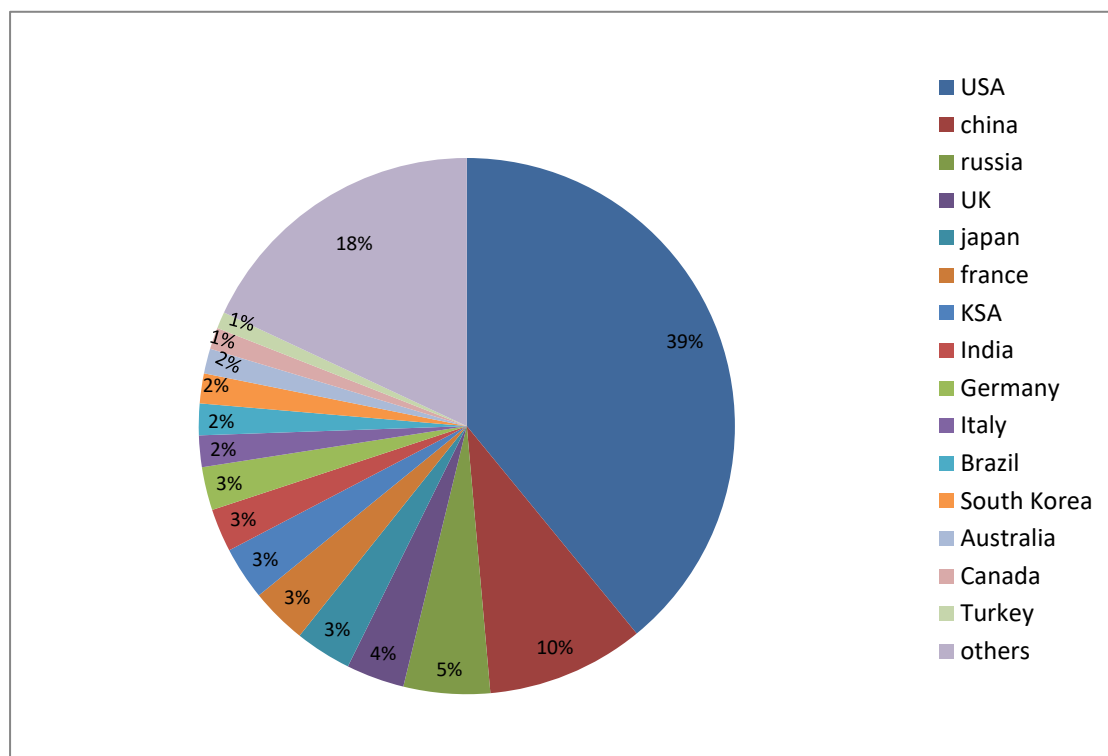


Figure 6 States with the highest military expenditure in 2012

Source: SIPRI Military Expenditure Database 2013, [http:// milexdata.sipri.org](http://milexdata.sipri.org)

Table 1 shows the average Military spending and natural resources rents from 1988 to 2012 for MENA Countries. As estimated at the table Oman, KSA, Kuwait, and Jordan represent the highest Milex spenders. In addition the patterns of GDP per Capita at the table are close to GDP growth percentages; higher GDP per capita is linked with high GDP growth except in the cases of Sudan and Syria. Moreover, the highest GDP per capita countries are oil producers such as Qatar, UAE, and Kuwait. Moreover, Morocco and Iran are the only countries coal producers although they have small GDP percentage. Algeria, Djibouti, Egypt, and Sudan represent the highest forest rents ranging from 1.6 to 0.155. Morocco is the highest recipients of Mineral rents followed by Iran, Jordan and Tunisia. Qatar is the highest recipient of natural gas followed by Algeria, Bahrain, and Oman. Moreover, Oil rents are receipted by Iraq, Kuwait, and KSA their percentages are 77.9, 44.6, and 39.4% of GDP.

TABLE 1 Military Spending and Natural Resources Rent for MENA countries (Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Algeria	1.700	2.560	1903.710	0.000	0.155	0.081	10.934	12.667
Bahrain	5.000	5.530	12048.180	...	0.000	0.000	7.346	19.873
Djibouti	7.000	0.950	867.690	...	0.409	0.000	...	...
Egypt	6.500	4.560	1461.640	0.000	0.277	0.112	3.847	8.252
Iran	2.000	4.420	1604.600	0.022	0.056	0.406	5.753	25.868
Iraq	...	5.540	802.950	...	0.019	0.000	1.001	77.854
Jordan	9.400	4.330	1945.370	...	0.030	0.495	0.221	0.003
Kuwait	8.200	6.460	22128.670	...	0.000	0.000	2.308	41.593
Lebanon	1.200	4.810	4830.490	...	0.014	0.000	0.000	0.000
Libya	...	4.320	6924.940	...	0.039	0.000	2.681	36.966
Morocco	4.100	4.010	1391.700	0.003	0.213	1.047	0.012	0.005
Oman	18.300	4.890	8810.090	...	0.000	0.050	5.923	34.084
Qatar	...	13.100	31936.120	...	...	0.000	12.436	25.928
KSA	15.200	3.510	9248.990	...	0.000	0.007	2.753	39.475
Sudan	3.600	5.630	377.580	...	1.663	0.030	0.000	8.386
Syria	7.300	4.910	1232.310	...	0.018	0.084	2.242	20.721
Tunisia	2.300	4.160	2271.480	...	0.185	0.356	0.758	3.376
UAE	...	5.140	31648.550	...	....	0.000	3.507	18.154
Yemen	...	4.240	532.670	...	0.037	0.000	0.156	28.899

Table 2 shows the average Military spending and natural resources rents from 1988 to 2012 of South Asian Countries. As estimated at the table Pakistan & Sri Lanka represent the highest Military spenders although they have got low GDP Growth. In addition the patterns of GDP per Capita showed that Sri Lanka has got the highest GDP per capita and followed by India. In this table the highest Military is not linked with the highest percent of GDP growth such as Afghanistan it has got the highest GDP growth 8.9% but its Military is just 2.5%. Moreover, coal rents are dominated by India only by 1.6%. Forest rents is launched by Pakistan 4.7% and followed by Afghanistan by 2.9%. Mineral was led only by India and Oil rents as well; But natural gas recipient by India and Pakistan.

TABLE 2 Military Spending and Natural Resources Rent of South Asian Countries (Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Afghanistan	2.5	8.9	329.9	0.0	2.9	0.0	...	...
Bangladesh	1.3	5.1	395.1	0.1	1.0	0.0	2.3	0.0
India	2.8	6.4	643.4	1.6	1.2	0.7	0.4	1.1
Nepal	1.3	4.5	306.9	0.0	4.7	0.0	...	...
Pakistan	4.9	4.5	611.2	0.1	0.8	0.0	2.6	0.7
Srilanka	3.5	5.1	1120.8	....	1.0	0.0	...	....

Table 3 shows the average Military spending and natural resources rents from 1988 to 2012 of East Asia and Pacific Countries. As estimated at the table Korea, Singapore, and Vietnam represent the highest Military spenders. In addition the patterns of GDP per Capita at the table are far away to GDP growth percentages; higher GDP per capita is not linked with high GDP growth such as in China and Cambodia which they have the largest GDP growth but low GDP per capita and low Military. Moreover, Mongolia, China, and Vietnam are the only countries coal producers and they have the highest GDP growth percentage. Cambodia and Vietnam represent the highest forest rents ranging from 4.0 to 2.8. Mongolia is the highest recipient of Mineral rents followed by Australia and Indonesia. Malaysia is the highest recipient of natural gas followed by Indonesia and Thailand. Moreover, Oil rents are received by Vietnam, Malaysia and Indonesia their percentages are 6.4, 6.2, and 4.6 % of GDP.

TABLE 3 Military spending and Natural Resources Rent of East Asia and pacific Countries (Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Australia	2.0	3.3	28496.0	0.4	0.2	2.5	0.7	0.9
Cambodia	2.0	7.7	473.0	....	4.0	0.0	....	....
china	2.1	9.9	1616.8	2.4	1.1	0.8	0.2	2.4
Indonesia	0.8	5.3	1296.0	1.0	2.1	1.3	2.4	4.6
Japan	0.9	1.7	34514.5	0.0	0.0	0.0	0.0	0.0
Korea, rep.	3.0	5.7	12566.0	0.0	0.0	0.0	0.0	0.0
Malaysia	2.2	6.3	4879.1	0.0	2.1	0.1	4.1	6.2
magnolia	2.3	4.1	1187.6	4.5	1.2	11.2	....	0.9
New Zealand	1.3	2.3	20165.5	0.0	1.0	0.2	0.7	0.5
Philippines	1.7	4.1	1214.6	0.1	0.5	0.9	0.3	0.0
Singapore	4.3	6.9	25373.2	....	0.0	0.0	....	....
Thailand	1.9	5.5	2653.5	0.1	0.4	0.1	1.2	0.9
Vietnam	3.3	7.0	560.4	1.1	2.8	0.2	0.8	6.4

Table 4 shows the average Military spending and natural resources rents from 1988 to 2012 of Europe and Central Asia Countries. As estimated at the table Armenia, Turkey, Greece, and UK represent the highest Milex spenders. In addition the patterns of GDP per Capita at the table are not close to GDP growth percentages. Moreover, the highest GDP per capita countries are headed by Switzerland then followed by Denmark and Austria. Moreover, Kazakhstan is the only country coal producers although it has small GDP percentage. Finland represents the highest and the only forest rents recipient. Bulgaria and Kazakhstan are the highest recipients of Mineral rents. Kazakhstan is the highest recipient of natural gas followed by Romania and Netherland. Moreover, Oil rents are dominated by Kazakhstan by 22.1 of GDP.

TABLE 4 Military Spending and Natural Resources Rent of Europe and Central Asia Countries (Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Armenia	3.3	3.2	1425.3	....	0.0	0.8	....	....
Austria	1.0	2.3	31019.6	0.0	0.2	0.0	0.1	0.1
Belgium	1.5	2.0	29351.8	0.0	0.0	0.0	0.0	....
Bulgaria	2.6	1.5	3118.1	0.3	0.4	1.1	0.1	0.0
Denmark	1.6	1.4	38229.8	0.0	0.0	0.0	0.4	1.2
Finland	1.5	2.2	30754.7	....	1.0	0.1	....	....
France	2.8	1.8	28102.6	0.0	0.1	0.0	0.0	0.0
Germany	1.6	1.8	29339.8	0.0	0.1	0.0	0.1	0.0
Greece	3.2	1.4	15881.5	0.1	0.0	0.1	0.0	0.0
Hungary	1.8	1.0	7165.5	0.0	0.2	0.0	0.5	0.4
Ireland	0.8	2.5	30558.5	0.0	0.1	0.1	0.1	....
Italy	1.9	1.2	24702.8	0.0	0.0	0.0	0.1	0.1
Kazakhstan	1.0	2.8	3791.7	5.5	0.0	1.7	3.6	22.1
Nether land	1.8	2.3	30917.0	0.0	0.0	0.0	1.3	0.1
Poland	2.0	3.8	6012.5	0.6	0.3	0.4	0.2	0.0
Portugal	2.1	2.2	13862.1	0.0	0.2	0.1	....	....
Romania	2.6	0.7	3501.8	0.1	0.6	0.1	2.6	1.9
Spain	1.3	2.6	19574.1	0.0	0.1	0.0	0.0	0.0
Sweden	1.9	2.2	34686.0	0.0	0.6	0.2	....	0.0
Switzerland	1.2	1.7	46876.3	....	0.0	0.0	0.0	....
Turkey	3.3	4.2	5104.3	0.1	0.2	0.1	0.0	0.2
United Kingdom	2.9	2.2	27337.4	0.0	0.0	0.0	0.5	1.0

Table 5 shows the average Military spending and natural resources rents from 1988 to 2012 of Latin America Countries. As estimated at the table Cuba, Colombia, and Chile represent the highest Military spenders. In addition the patterns of GDP per Capita at the table are close to GDP growth percentages; higher GDP per capita is linked with high GDP growth such as in the cases of Chile. Moreover, the highest GDP per capita countries are Mineral recipients such as Chile, Argentina, and Peru. Moreover, Colombia is the only country coal producers.

Honduras and Guatemala represent the highest forest rents ranging from 2.9 to 1.4%. Chile is the highest recipient of Mineral rents followed by Peru, and Jamaica. Argentina is the highest recipient of natural gas followed. Moreover, Oil rents are receipted by Mexico, Colombia, and Argentina their percentages are 5.4, 5.1, and 3.0% of GDP. In addition, Brazil military spending in the recent years has witnessed a 2% increase as a percentage of GDP from its natural resources pans. According to Celso Amorim, Defense Minister, *“Brazil’s growing need to protect its borders, the Amazon rainforest, and massive offshore oil discoveries would lead it to gradually increase defense spending by a quarter to reach roughly 2% of the country’s GDP.”* In addition, he added that *“Brazil has good relations with all ten of its South American neighbors, and hasn't been to war with any of them since the 19th century, so defense spending has historically been seen as a second-tier priority.”*

TABLE 5 Military Spending and Natural Resources Rent of Latin America Countries (Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Argentina	1.1	2.8	6537.4	0.0	0.1	0.2	1.8	3.0
Brazil	1.9	2.6	5043.1	0.0	0.7	1.1	0.0	1.5
Chile	2.6	5.4	6275.3	0.0	0.8	10.3	0.2	0.1
Colombia	3.1	3.7	3064.1	0.3	0.2	0.4	0.5	5.1
Costa Rica	....	4.8	4351.6	....	0.7	0.0	.....	....
Cuba	4.2	1.6	2990.4	....	0.1	0.7	0.1	1.0
Guatemala	0.8	3.7	1824.5	....	1.4	0.1	0.0	0.0
Honduras	0.8	3.7	1190.4	....	2.9	0.6	....	....
Jamaica	0.6	1.8	3290.4	....	0.2	3.0	....	....
Mexico	0.5	2.8	5660.2	0.0	0.2	0.3	0.6	5.4
panama	1.3	5.0	4215.6	....	0.2	0.1	....	....
Peru	1.3	3.5	2663.9	0.0	0.3	4.2	0.2	1.8

Table 6 shows the average Military spending and natural resources rents from 1988 to 2012 of North America Countries. As estimated at the table United States represents the highest Military spender. In addition the patterns of GDP per Capita at the table are close to GDP growth percentages in the case of US but less likely in the case of Bermuda. Moreover, the highest GDP per capita is Bermuda although its non recipient for any natural resources rents. Moreover, no country is coal producers. Canada represents the only recipient for forest rents and Mineral rents by small scale. Canada is the highest recipient of natural gas followed by US. Moreover, Oil rents are received by Canada and US their percentages are 1.6 and 0.4% of GDP.

TABLE 6 Military Spending and Natural Resources Rent of North America Countries
(Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Bermuda	.....	1.9	54883.9	.....	....	0.0	....	...
Canada	1.4	2.4	28498.7	0.0	1.2	0.4	1.1	1.6
United States	4.1	2.5	34351.6	0.0	0.2	0.0	0.2	0.4

Table 7 shows the average Military spending and natural resources rents from 1988 to 2012 of Sub-Sahara Africa Countries. As estimated at the table Eritrea is the highest Military spender then followed by South Sudan and Angola. In addition the patterns of GDP per Capita at the table are close to GDP growth percentages in the case of Angola; higher GDP per capita is linked with high GDP growth except in the cases of Uganda. Moreover, South Africa and Chad are the only countries coal producers although they have small GDP percentage. Ethiopia and Uganda represent the highest forest rents ranging from 8.0 and 7.1%. South Africa is the highest recipients of Mineral rents. Nigeria is the highest recipient of natural gas. Moreover, Oil rents are received by Angola, Congo, and Nigeria their percentages are 65.5, 52.7, and 32.6% of GDP.

TABLE 7 Military Spending and Natural Resources Rent of Sub-Sahara Africa Countries (Averages, 1988–2012, as Percentage of GDP)

Country	Military expenditure %GDP	GDP growth	GDP per capita (in dollars)	Coal (in dollars)	Forest (in dollars)	Mineral (in dollars)	Natural Gas (in dollars)	Oil (in dollars)
Angola	5.7	5.8	11682.4	....	1.1	0.0	0.4	65.5
Burkina Faso	1.3	5.1	335.8	....	3.6	0.9	.....	.....
Cameroon	1.3	1.4	891.6	1.6	1.7	0.0	0.3	7.4
Chad	2.5	5.5	386.8	.....	3.8	0.0	.....	41.9
Congo	1.3	2.8	1464.4	.....	2.9	0.1	0.4	52.7
Eritrea	23.8	3.9	236.9	.....	1.7	0.0	.....	.....
Ethiopia	3.4	5.6	211.2	.....	8.0	0.1	.....	.....
Ghana	0.5	5.5	620.9	.....	3.3	2.0	.....	0.1
Kenya	1.8	3.4	490.1	.....	2.1	0.0	.....	.....
Malawi	1.0	3.8	217.3	.....	4.9	0.0	.....	.....
Nigeria	0.8	5.0	607.9	0.0	2.1	0.0	2.1	32.6
Rwanda	2.9	5.0	319.1	.....	3.4	0.0	0.0	.....
Senegal	1.6	3.3	733.0	....	1.3	0.3	0.0	0.0
Somalia	....	0.7	162.5	....	5.2	0.0	....	.....
South Africa	1.9	2.6	4301.4	2.2	0.9	1.7	0.1	0.2
South Sudan	6.2	-11.3	1426.7	....	.....	.....	.....	.....
Sudan	2.7	4.7	675.7	.....	0.0	0.0	.....	9.6
Tanzania	1.3	5.1	317.6	0.0	3.7	1.1	0.5	....
Uganda	2.5	6.7	315.1	....	7.1	1.1	....	....
Zambia	2.0	3.2	609.2	0.0	2.4	9.9	....	....

Military Expenditure and Natural Resources

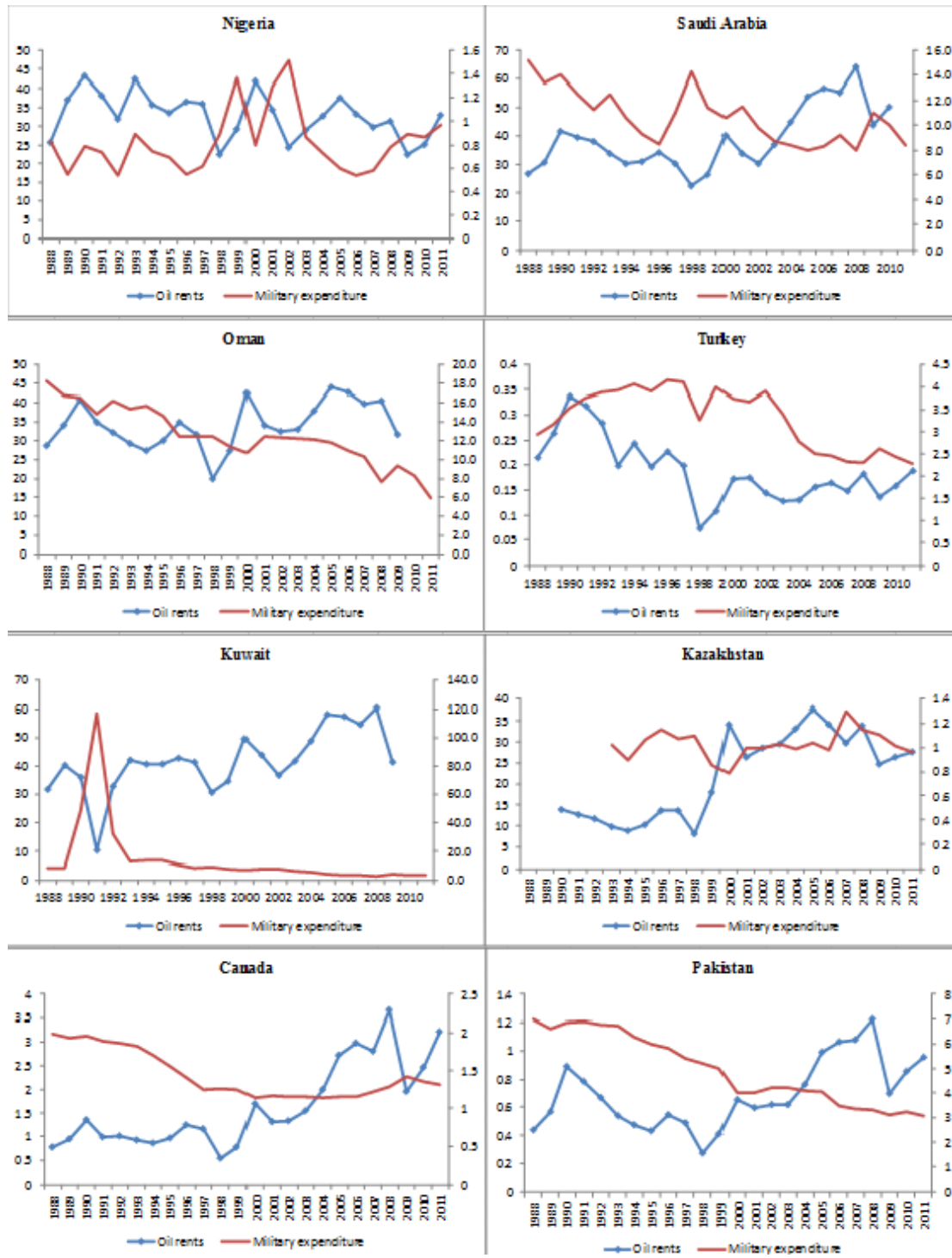


Figure 7 Oil Rents and Military Expenditure as Percentage of GDP

Military Expenditure and Natural Resources



Figure 8 Oil Rents and Military Expenditure as Percentage of GDP

Figures 5 & 6 showed that military spending is following the pattern of oil rents in different countries around the world that have high oil rents or military spending in order to examine is there a relation between natural resources and military spending. We could see different movements between oil rents and military spending between countries for example in MENA countries such as Oman, Kuwait, and KSA we could see as the oil rent increased the military spending pattern followed the same scenario. While at South Asia such as Pakistan it has got the highest military spending although it oil pattern is the lowest one. In addition, in East Asia Singapore represents the highest military spending country although it has no oil rents but that contradicts with Vietnam case it represents the second level of the highest military spender with the highest oil rents. In Europe and Central Asia we could find that Turkey and Armenia have got the highest military spending but the lowest oil rent pattern. However, Kazakhstan has monopolized the oil rent by 22.1 and at the same time it was noticed as the lowest military spender country. Colombia and Cuba have the highest military spenders in Latin America but Colombia has more oil rents than Cuba. Moreover, Moving to Sub-Sahara Africa countries where we could find the largest oil patterns in Angola, Congo, and Nigeria. And at the same time they have the highest military spending. And there's a direct relation between these percentages of military spending and oil rents.

3.2. Methodology:

This study assessing the impact of natural resources on military spending; using panel data for 119 countries for years 1988-2012, I will extent the model estimated by Ali and Omnia (2012) on military spending and natural resources in MENA countries to include more countries across different regions.

3.2.1Dependent variable: Military Spending

The dependent variable in the model is military spending (Milex) is measured as percentage of GDP, source SIPRI.

3.2.2Independent variable:

The independent variables in the model are oil, coal, minerals, and gas rents whereas they measured as percentage of GDP in order to assess their effects on the increase in the military spending. In addition, I'll use Openness to trade as an additional variable to examine its relation to military spending.

3.3 Variables

3.3.1. Oil& Natural Gas

Oil revenues in some countries provide an opportunity to spend more in military. In addition, the countries can engage in long term contracts with weapon producing countries, evidence, countries like KSA, Venezuela, and Kuwait; these countries for years have been engaged in buying the military equipment and weapon acquisition for years. Therefore, in this model we hypothesize that the oil revenue is increasing military spending, this hypothesis is consistent with findings (Ali and Omnia, 2012; Sam, 2011).

3.3.2. Minerals

According to (SIPRI, 2013) "A factor that has aided the upward trend in military expenditure is the high and rising world market prices of minerals and fossil fuels". This increase was especially in Algeria, Russia, Azerbaijan and KSA, where this increased from minerals and fossil fuels which have enhanced government revenues and promoted funds for military spending. "The enhanced in the military expenditure of Chile and Peru is directly from resource rent because their military spending is linked by law to profits from the exploitation of key natural resources"(SIPRI, 2013).

In addition, China and India, *the world's two emerging economic powers*, increased and sustained in their military spending and sharing at the growth in world military spending. *"In absolute terms their current spending is only a fraction of the USA's. Their increases are largely commensurate with their economic growth and that increase in mineral rents, result in increasing military spending"*(SIPRI, 2013).

3.3.3 Coal

In the United States, an amendment to a military spending bill was presented before the House Armed Services Committee according to the federal law of 2007 to hinder the Defense Department from using alternative fuels, like synthetic oil that is made from coal, which produce more climate-altering pollution. A bill containing the Amendment passed in May 2011.

It is important to note, that the US military's annual consumption is about 120 million barrels of oil, which is a grand cost to the federal government, but also a strategic risk, because of the volatility of world oil markets. Accordingly there are attempts by the Defense Department as a goal of obtaining 25 percent of its energy from renewable resources by the year 2025.

An important point is the according to the US own acknowledgement that climate change is a national security threat. Daniel J. Weiss the director at the Center for American Progress called for the Congress to reject this provision suggesting the use of high-emission alternative fuels.

Therefore, coal industry not only vital for producing energy but also could be source of contest among nations. Government could justifiably use the rent from coal to increase the military spending to protect the coal mines. One of the examples that could be initialized is Iran. The actual Iran's coal resources exceed 1.5 billion tones. In addition, it has 130 coal active mines. Total export and extraction amount were 1.9 million tones.

3.3.4. GDP growth and GDP per capita income

Economic development is not only including growth but also shows the general improvement in welfare of the citizen. In this study we use GDP growth and GDP per capita as measures to the levels of economic growth. The developed countries tend to spend less on military spending and our hypothesis is the high development the lower the military spending. In fact this hypothesis remains to be tested.

3.3.5 Openness to trade

Openness to Trade (representing imports and exports) is an important indicator to any successful economy of a country. It could be measured as:

$$= \frac{\text{Imports} + \text{exports (both goods and services)}}{\text{GDP}}$$

This variable will be used in order to assume that the military capability of any country could be produced by utilizing inputs from a '*country's endowments*'. Therefore, in this model we hypothesize that openness to trade has a negative impact on military spending, this hypothesis is consistent with findings of (Seiglie, 1988) at his study "Openness of the Economy, Terms of Trade and Arms" when he assured that openness has a great impact on military spending of country.

3.4. Empirical Model:

The model estimates the relation between military spending and natural resources:

$$\text{Milex}_{it} = B_0 + B_1 \text{GDPG}_{it-1} + B_2 \text{GDPPcapit}_{it-1} + B_3 \text{Coal}_{it-1} + B_4 \text{Forest}_{it-1} \\ + B_5 \text{Mineral}_{it-1} + B_6 \text{NaturalG}_{it-1} + B_7 \text{Oil}_{it-1} + B_8 \text{Openess}_{it} + v_i + \emptyset_t + \epsilon_{it}$$

Where: country (i), time (t), military expenditure (Milex_{it}), GDP annual growth rate (GDPG), GDP per capita in constant 2000 US\$ (GDPPcapit), coal rents as percent of GDP (Coal), forest rents as percent of GDP (Forest), mineral rents as percent of GDP (Mineral), natural gas rents as percent of GDP (NaturalG), oil rents as percent of GDP (Oil), & openness, the country effect (v), the time effect (\emptyset), and the error term (ϵ).

Chapter Four: Results and Discussions

4.1 Results

Regression in Table 8, shows that using dynamic panel vs. fixed effect model where the results doesn't change drastically except the natural gas variable it becomes insignificant in model 2 at the fixed effect model and model 3 and model 4 in dynamic panel. Variable for economic growth and per capita income are statistically significant at 5% and 1% percent respectively. However, the rent from coal is not significant across the models except in model 2 by 1% percent.

For the coefficient interpretation as follows it shows that the per capita income and economic growth are negatively impact the military spending. For example, as GDP growth by 5% result in reducing military expenditure by 0.022%. In addition, the same scenario for Model 2, 3, and 4 we could find GDP Growth by 1% result in reducing military spending by 0.015%, 0.12%, and 0.011% respectively. The same case for GDP per capita a thousand dollar increase in GDP per capita, military spending decreases by 0.036 dollars in Model 1. In addition, in model 2, 3, and 4 they have got the same case as Model 1. Military spending decreases by 0.031, 0.015, and 0.149 dollars. The findings of negative relation between defense spending and economic development is consisted with the earlier studies of (Ali, 2012; Dunne, P., Nikolaidoua, E. and Vougas, D., 2001; Smith, R. and Dunne, Paul.J, 2002).

Moreover, Rent from the forest is significant at 1% level across the Models. For the two variables minerals and natural gas rent are ambiguous across the models. Natural gas is significant in model 1 while it's not significant in the other Models. In addition, minerals rent is significant in Model 4 while it's not significant in the other Models. That findings contradicts with (Ali & Omnia, 2013; Smaldone, 2006).

They found that the countries' rent from forests has got a great impact on rising military spending, and it was highly significant across their proposed models. *“For example, 1% increase in forest earnings increases military spending in the range of 2.5 to 3.2%.”*

\The rent from oil is statistically significant at 10% in Model 1 and Model 3 and by 5% in Model 4. However, when we introduced openness the oil rent became significant in Model 2 but remain significant in the other models. Our only interpretation is that the openness to trade means, the country economy will be transformed and oil as input in the production process that might affect the results. Moreover, in dynamic model the oil rent remains significant.

Table 8: Fixed effect model & Dynamic Panel Dependent Variable is Military Expenditure

Variables	Fixed Effect Model		Dynamic Panel Model	
	Model 1	Model 2	Model 3	Model 4
Milex_GDP_{it-1}	-----	-----	0.7062078 (26.95)***	0.6922533 (24.91)***
GDPG	-0.0224652 (-2.80)**	-0.0150594 (-2.21)***	-0.0128559 (-2.88)***	-0.0111828 (-2.48)***
GDPC	-0.0000364 (-7.79)***	-0.0000319 (-8.05)***	-0.000015 (-2.91)***	-0.000149 (-2.89)***
Coal_R	0.0850237 (1.32)	0.132884 (2.44)***	0.0202895 (0.50)	0.0255699 (0.63)
For_R	0.3681014 (6.66)***	0.3382436 (7.04)***	0.2304491 (2.98)***	0.2299554 (3.00)***
Min_R	0.0202372 (0.77)	0.0240797 (1.08)	0.0288884 (1.15)	0.0470098 (1.83)*
NG_R	-0.0398323 (-1.56)*	0.0264199 (1.22)	-0.0185616 (-1.30)	-0.0125688 (-0.87)
Oil_R	0.0224407 (1.67)*	0.0161767 (1.39)	0.0146689 (1.70)*	0.176026 (1.99)**
Openness	-----	-0.0118195 (-5.56)***	-----	-0.0052903 (-2.06)**
Constant	2.6657 (31.00)***	3.120132 (26.16)***	0.7040775 (6.58)***	-0.9740374 (5.75)***
F	19.57	27.38	81.24	1610.93
R²	0.1256	0.1880	-----	-----
N	1011	1004	902	899

Notes:

***Statistical significance at 1% significance level

**Statistical significance at 5% significance level

*Statistical significance at 10% significance level

Table 9, shows the panel regression data GMM; dependent variable Military spending. The coefficients estimates for Military spending as a percentage of GDP, GDP growth, GDP per capita income, Coal rents, Forest rents , Minerals rents, Natural Gas rents, and Oil rents. Variables for economic growth and per capita income are statistically significant at 1% and 5% respectively in Model 1 and at the Models 2 they are significant by 1% and 10% respectively. However, the rent from coal is not significant in Model 1 but significant by 10% in Model 2. The same case in the rent from Forest which is insignificant in Model 1 and significant in Model 2 by 5%. In the case of Mineral rent is insignificant in both Models.

Moreover, rent from natural gas is significant in both models by 10% and 5% respectively. The rent from oil is statistically significant at 10% in both Models. However, the only rent from the natural gas and oil are statistically significant, the rent from the forest is ambiguous. That findings contrast to certain studies, the oil and natural rent impacts on defense spending is consistent with the findings from previous research (Smith, R., 2000; Ali, 2011). In addition, the Openness to trade variable has a negative impact on military spending for both Model 1 and 2. At model 1 and 2 it's significant by 10%.

For the coefficients interpretation as follows it shows that the per capita income and economic growth are negatively impact the military spending. For example as GDP growth by 1% result in reducing military spending by 0.012%, and the same scenario for the second Model we could find GDP growth by 1% result reducing military spending by 0.011%. The same case for GDP per capita a thousand dollar income in GDP per capita, military spending decreases by 0.0164 Dollars in Model 1, and in Model 2 military spending decreased by 0.0192 Dollars. In addition, rents from Natural Gas have the same impact as GDP per capita and GDP growth. It affects the military spending negatively by reducing it by 0.013%, 0.016% in Model 1& 2 respectively.

Table 9: Panel Data GMM; Dependent Variable Military Spending		
Variables	Model 1	Model 2
$\Delta \text{Milex_GDP}_{it-2}$	0.761329 (41.67)***	0.732001 (17.47)***
$\Delta \text{GDPG}_{it-1}$	-0.012259 (-2.46)***	-0.011859 (-2.50)***
$\Delta \text{GDPC}_{it-1}$	-0.0164 (-1.86)**	0.0192 (-1.79)*
$\Delta \text{Coal_R}_{it-1}$	0.030984 (1.14)	0.036485 (1.30)
$\Delta \text{For_R}_{it-1}$	0.134552 (1.14)	0.180737 (2.00)**
$\Delta \text{Min_R}_{it-1}$	0.044865 (1.27)	0.054547 (1.28)
$\Delta \text{NG_R}_{it-1}$	-0.013506 (-1.60)*	-0.016237 (-1.92)**
$\Delta \text{Oil_R}_{it-1}$	0.010446 (1.81)*	0.009931 (1.70)*
Openness	-0.004476 (-1.24)***	-0.005859 (-1.38)***
F	-----	-----
N	916	912
Notes: ***Statistical significance at 1% significance level **Statistical significance at 5% significance level *Statistical significance at 10% significance level		

4.2 Discussion

Overall the results from Table 8 and 9 showed that the presence relation between military spending and natural resources. In Table 8, it's obvious to show that effect from its variables such as Gross Domestic Product Growth (GDPG) and Gross Domestic Product per capita (GDPC) which they are significant variables and they affect military spending negatively and that contradicts with the previous studies that I mentioned at the literature review such as (Hou,2009; Ali, 2012; Dunne, P., Nikolaidoua, E. and Vougas, D., 2001; Smith, R. and Dunne, Paul.J, 2002).Those studies assumed that there's a negative impact of military spending on the economic growth.

In addition, that contradicts also with (Kentor& Kick, 2008) when they assumed that military spending prohibit the growth of per capita GDP. (Ando, 2009) examined also this relation and his results showed that when an economy increases the military spending increase and there's no negative relation between military spending and economic. Moreover, going back to my results at Table 8 that it's similar to (Tambudzai, 2007) When he assured the importance of GDP per capita in estimating the level of military "Burden" that a country could afford. Tambudzai's study is linked to (Lai et al, 2002) when their results showed that if a country spends more on its defense, it will enjoy high growth rates and that will lead to economic growth.

Furthermore, the previous studies showed the interrelation between natural resources and military spending and these studies showed there is a linkage with the primary commodities especially Oil. These findings are linked to my findings at Table 8 where Oil Rents represent the most significant natural resource that has got positive relation to military spending.

In addition, Openness Variable has a crucial impact on military spending. At Table 8 and 9, openness is a crucial and significant variable that affects military spending negatively because as we know most of the countries prefer to imports armed weapons and that give a high chance of spending more.

In Table 9, it has got the same scenario as Table 8. The results showed that GDPG, GDPC, while oil has positive impact on military spending. In addition, the variable of natural gas in model 9 and 10 shows that is significant at 10% & 5% respectively and it affects military spending negatively.

This mean that GDPG, GDPC, Openness, and natural resources such as Oil Rents and Natural Gas have got a significant effect on military spending, while other factors are not. This means that those factors that have got a significant effect are crucial to control the military spending of a country.

Chapter Five: Conclusion and Recommendations

5.1 Conclusion

The objective of this thesis was to what extent do the natural resources affect the military spending? Is the countries level of development whether low, middle, or high income levels vis-à-vis military spending and natural resources matters? The implications of that would be used in order to develop new policies that can address that increase in the military expenditure, resulted for windfall of natural resources.

To answer this question I used global data on GDPG, GDPC, Natural resources Rents, and openness, and levels of Income, that were collected for 119 countries for a period of 24 years, from 1988 to 2012. The empirical results in this study have shown that there is in fact a differential impact of the different types of Natural resources and economicdevelopment variables on the military spending rates. More specifically the study found that military spending was impacted negatively by the development variables. Furthermore, the presence of Oil Rents had a significant impact as shown in Table 9 & 10, than did Natural Gas.

This paper's shortcoming with regards to the availability of data suggests areas of future research which could be used in order to develop new policies that can address that increase in the military expenditure, resulted for windfall of natural resources.

This thesis aims to give a potential intervention to reduce the military spending burden by reviewing their policies and getting the most use of their natural resources that have negative impact on their defense spending such as Oil and natural gas. Moreover, a variable such as Openness has got a crucial significant impact on military spending as I introduced at Table 8 and 9.

5.2. Recommendations

Governments expend from 3% to 8% of their gross domestic product (GDP) and 5% to 30% of central government expenditure (CGE) and 11% from the global rates on defense sector. In addition, the international monetary fund (IMF) found that countries with high levels of military spending (% of GDP) is associated positively with high levels of corruption, poverty and authoritarian government.(Gupta, Sanjeev et al., 2000).

In the recent years, many governments of Netherlands, Canada, and UK have published their overall military spending levels. This policy is very important to be followed by other nations in order to reduce the concept of authoritarianism, levels of corruption, and poverty rates.

More focus on development and pay attention on gross domestic product growth (GDPG) and gross domestic product per capita income (GDPC). Because these variables have got a great impact on military spending.

Follow the policy of how to allocate recourse effectively and take to our consideration the concept of 'Resource Curse' because some minerals have got a great impact on military spending such as oil and natural gas. In addition, they have got an impact on social development and welfare.

In addition, focus more on openness. This variable has got a great impact on military spending because it represents the rates of imports and exports. In contrast, this variable will disclosure the transparency and accountability of the trading transactions between nations.

Finally, discuss the policy of reducing oil prices. By reducing oil prices that will reduce a country's economy because of the reduction oil demand and will limit the ability to increase their military spending and reduce the threats to their neighbors.

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